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AsiaPacific

ISSUES

Analysis from the East-West Center
No. 81
August 2006

SUMMARY The Indian economy's strong growth in recent years has given new impetus to long-standing efforts to develop the country's poorest rural areas. Growth has increased government resources and raised expectations among the rural poor for improvements in their well-being. Findings of a long-term study of farming households in Eastern India suggest the importance of local circumstances in developing policies intended to raise the welfare of poor families in remote, agriculturally unfavorable, areas. The history of government rural development efforts in India is largely disappointing, but recent policies, including the National Rural Employment Guarantee Scheme, signal a reversal of top-down national policies and improve prospects for these agricultural areas. Program decentralization and allowing localities broad latitude in developing interventions that encompass agricultural, manufacturing, and labor market-based pathways for raising rural livelihoods are critical in these efforts. Success in rural development efforts in India is vital to maintaining support for economic reforms and sustaining the nation's growth.

Rural poverty mitigation efforts should offer a menu of development alternatives for localities to pick and choose from

Introduction

Rural development and poverty alleviation efforts have long been a policy priority in India, but they have gained new impetus as a result of India's renewed economic vigor and political developments of recent years. The acceleration of the nation's economic growth and rising prosperity in a number of its metropolitan areas has raised expectations about improvements in the well-being of the poor in India, even as the higher growth appears to be contributing to a growing gap between rich and poor. Increasing relative poverty among rural households, which make up a majority of the population, is particularly worrisome, in part because it increases the potential for political unrest in the countryside. The victory of the Congress Party-led United Progressive Alliance (UPA) in the 2004 national election brought Prime Minister Manmohan Singh to power on a platform promising continued economic reform to achieve a more inclusive and equitable distribution of the benefits of growth. Upon taking office, Singh quickly announced that rural poverty reduction would be a top development priority of his government.

Nationally, India has reduced poverty significantly in recent decades, although the precise magnitude of the decline is fiercely debated.[1] Government statistics show that in both rural and urban areas the share of the population living below the official poverty line fell by nearly half between 1977 and 2000. Due to population growth, however, the absolute number of poor persons fell by less than 21 percent during this period. Regional disparities in poverty incidence have risen and likely contributed to pressures for the creation of new states and actions by armed opposition groups like the Naxalites and Maoist rebels. Nearly all Indian states showed declines in poverty during the 1990s, but states in Eastern India generally have higher poverty rates and have been less successful at reducing poverty. Many of the poorest states lie within what is sometimes referred to as India's "Tribal Belt," which adds a caste/ethnic dimension to regional inequality (see map, page 3).[2] Orissa state had the highest poverty incidence and lowest decline in poverty between 1993 and 2000.[3] Bihar, West Bengal, Chhattisgarh, and Jharkhand states are also among the poorest in the country. These states' economies remain predominantly agricultural, so advancing the income generating capacity of small farms must involve increasing agricultural productivity among other measures.

Evidence from an in-depth study of farming households in the Eastern India portion of the Tribal Belt suggests that efforts to spur development in small-farm areas should explicitly embrace the goal of poverty reduction and de-emphasize the goal of increasing

The Study of Small-Farm Households

In 1998, a multidisciplinary team of researchers currently with the Indian Statistical Institute (ISI) in Kolkata, the International Rice Research Institute (IRRI), and the East-West Center (EWC) began a long-term study of farm households in Giridih and Purulia districts of Jharkhand (part of Bihar state prior to 2000) and West Bengal states, respectively. Herein, this study is referred to as the ISI study. These neighboring rural districts were selected because they are similar ecologically, yet distinct sociopolitically. For example, the *panchayats*, or local governing councils, are well developed and land reform has been actively implemented in Purulia. In Giridih, local democracy is less developed and local economic and political affairs have been historically controlled by landholding elites. Caste/ethnic relations in Giridih also tend to be more traditional, with greater tolerance of discrimination against lower caste and tribal families. Both districts lie on the Chhotanagpur Plateau, an extensive rainfed agricultural area in Eastern India where soil degradation, erosion, and deforestation are advanced. Many districts on the plateau have high poverty rates and large scheduled caste (SC) or scheduled tribe (ST) populations.[4]

The ISI study combined geographic modeling with agricultural and socioeconomic survey data of 541 households from eight villages in each district in an effort to (1) identify the biophysical and socioeconomic factors driving farmers' livelihood strategies, (2) assess the potential of available interventions to achieve sustained improvements in small farm household welfare, and (3) determine exit paths from poverty and natural resource degradation in the area. As one point of focus, the study examined agricultural productivity and efficiency in cultivating rainfed rice, the main crop in the area. The biophysical environment was characterized using remote sensing of satellite images and through climate modeling using historical meteorological data.

Past grandiose development schemes have imposed top-down policies with inadequate flexibility at the local level

agricultural production emphasized in past policies.[5] Rural poverty mitigation efforts should offer a menu of development alternatives for localities to pick and choose from in accordance with local situations.[6] These options should include agricultural development, but extend to development of rural industry. And, in what would be a significant departure from past strategies, they should extend to facilitating human resource development and rural-urban labor market integration.

Basing strategies on comprehensive knowledge of local environmental and socioeconomic conditions is imperative.[7] In India's recent past, grandiose development schemes have imposed top-down policies with inadequate flexibility at the local level. And, given the magnitude of the developmental needs in India's remote, environmentally unfavorable areas, perennial shortfalls in funding have thwarted past initiatives.

While recommendations that development strategies must be based on local conditions come from a detailed study of households in selected areas in Eastern India, they follow a broader debate in development circles regarding failures in and remedies to past development efforts.[8]

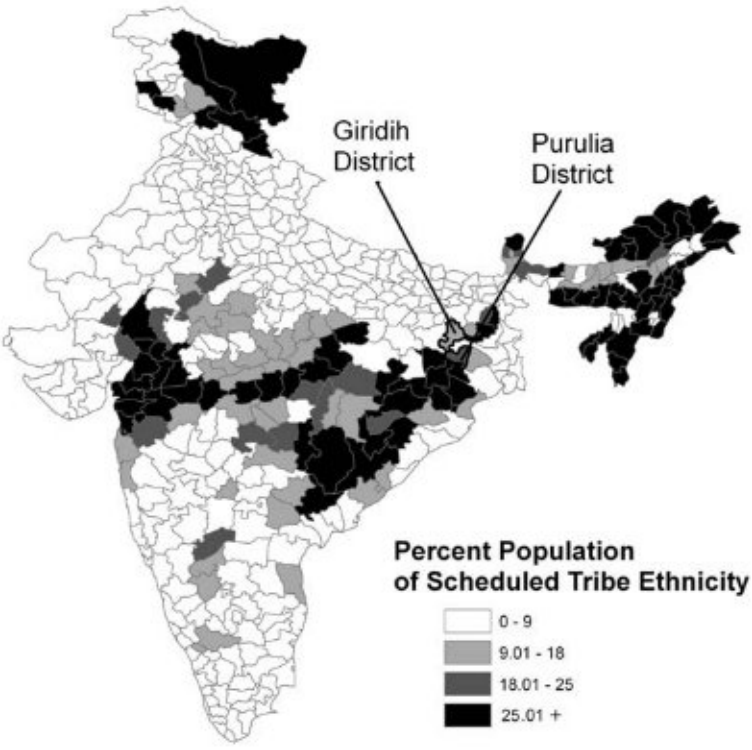

Fig. 1. India's "Tribal Belt"

Post-independence Rural Development Policy in Eastern India

The Indian government's rural development efforts have a long and often disappointing record. A look back at some of the public programs that have aimed to develop rural areas and improve the well-being of local inhabitants will shed light on our later discussion of the chief findings and policy recommendations from the ISI study.

Following independence from Britain, India instigated rural development policies that can best be understood as a sweeping effort to apply state planning and market controls to quickly shift the economy from one structured to supply raw industrial materials and a few consumer goods to the British Empire, to one that satisfied the food and other needs of the Indian people and fostered national integration. These "planning era" goals were particularly clear in the agricultural sector, where, under British rule, agricultural production was focused on the production of cotton, indigo, sisal, sugar, and tea on large plantation-style farms and by small farms occupying the lowest tier of hierarchical landlord-tenant arrangements. The government sought to encourage food production and break up the indirect control British enterprises exercised in key agricultural markets. Following independence, seed and fertilizer industries were nationalized and an extensive system of agricultural price and import/export controls was established. The Agricultural Price Commission took measures to stabilize prices and ensure adequate producer prices, while also ensuring consumer access to affordable food staples through a public distribution system. To encourage adoption of green revolution technologies, fertilizer consumption was heavily subsidized. Banks were nationalized and public rural financial institutions were established to provide agricultural credit to small- and medium-sized farms. The development of new agricultural technology and

seeds was pursued through a national agricultural research and extension system. There was massive state investment in the construction of rural infrastructure, particularly to extend irrigated lands and the area suitable for intensive cultivation. Land reform was embraced as an aspiration at the national level, but responsibility for enacting and implementing land reforms was delegated to the states. Many states passed tenancy reform measures, laws to regulate agricultural middlemen and informal moneylenders, and other land reform legislation. Progress in equalizing the distribution of land was generally limited, however, as implementation of land reform initiatives was weakened or stalled under pressure from landed elites.[9]

An important facet of many planning era rural development policies was their focus on developing relatively favorable agricultural areas where irrigation could be extended at lower cost and green revolution technologies more readily adopted. This was clearest in the case of the Intensive Agricultural District Program that targeted selected rural districts with relatively favorable agricultural environments but low levels of development for investment and technology transfer. A side effect of this strategy, however, was neglect of unfavorable areas, like the region in Eastern India considered in the ISI study. It also helped widen the gap between relatively prosperous irrigated agricultural areas, like those in Punjab and Haryana states, and less favorable rainfed agricultural areas. Large- and medium-sized farms were the primary beneficiaries of the green revolution and of the rural development policies adopted during the planning era.[10] As cheaper food became available, the other chief beneficiaries of the green revolution were urban consumers, particularly those from poor households expending large shares of their incomes on food. On the other hand, cheaper grain prices likely made farmers in rainfed areas worse off by lessening the little income they could generate from the grain they sold. Nonetheless, farm households in unfavorable areas benefited indirectly from the green revolution through labor market and non-farm income channels.[11]

Large- and medium-sized farms, and urban consumers, were the primary beneficiaries of the green revolution

Industrial policies of the planning era also contributed to the poor economic performance of farms in rainfed areas of Eastern India. Two of the main objectives of these policies were to propel faster industrialization and foster national unity through balanced industrialization and regional economic integration across states. The government funded import substitution policies largely through taxation of agriculture.[12] Taxes included both explicit (tax revenues) and hidden (through price controls) sources of revenue. A transport policy that equalized the cost of rail transport of coal, iron ore, cement, and other key industrial inputs, and central government licensing and financing for new industries lessened the comparative advantage of industries in Eastern India. Prior to independence, this area had been an industrial heartland and a favored location for industry due to its proximity to raw materials used in manufacturing and Eastern India's main seaport in Kolkata. These policies, as well as the post-partition decline of industries that had relied on inputs from Eastern Bengal, led to a long decline in the industrial sector in Eastern India. This, in turn, adversely effected the region's farming households by reducing regional demand and non-farm employment opportunities.

State agricultural sector interventions adopted during the planning era have gradually been dismantled since the 1980s. Tariffs on imports have been lowered and quantitative restrictions on many exports have been reduced or eliminated. Government price subsidies—for fertilizers, for example—and price regulations have been reduced, bringing the domestic prices of many agricultural products closer to world prices. Public investment in infrastructure and support for rural financial institutions have declined, with predictable consequences in terms of reduced public sector capital formation and a decrease in the number of rural banks and availability of agricultural credit. Reforms have sought to lessen the state's role in regulating and subsidizing the sector in order to create a market environment in which farming resources can be applied more efficiently and reduce government spending in the face of fiscal deficits.

The UPA-led government intends to continue agricultural market liberalization efforts while reversing historical neglect of less favorable rainfed agricultural areas. The National Rural Employment Guarantee

The National Rural Employment Guarantee Scheme commits the government to providing 60 million jobs in poor rural districts

Scheme (NREGS) commits the government to providing 60 million rural households in 200 selected poor rural districts with jobs on local infrastructure projects determined and administered by local *panchayats*. The *Bhar Nirman* program sets an ambitious plan for developing new rural infrastructure and new programs intended to prompt adoption of innovative green revolution technologies adapted to rainfed agriculture such as expanded agricultural credit, and agricultural research and extension.

These recent developments raise prospects for unfavorable agricultural areas like the Chhotanagpur Plateau. But the search for broad national policy options continues to dominate new policy proposals and popular discussions about Indian agricultural policy. Regrettably, broad policy mandates have often suffered from an underappreciation for the distinct constraints and opportunities that shape the livelihood strategies of poor rural households in different parts of the country. As a result, they have often encountered little enthusiasm, ineffective implementation, and limited lasting impact in the localities they are intended to benefit.

Natural Resource Conditions Present Challenges

The Chhotanagpur Plateau has an undulating topography with elevations ranging from 820 to 1,640 feet. In this subtropical area, with its hot, wet summers and cool, dry winters, rainfall and water availability are serious constraints to agriculture. While the area's average annual rainfall would generally be adequate for agriculture, high seasonality of rainfall restricts farming seasons and creates soil erosion problems. Over 80 percent of yearly rainfall occurs during the annual monsoon season, from June to September, and the accumulated soil moisture influences farm cropping systems. Limited irrigation water is available from seasonal wells, surface reservoirs, and ponds, but surface water and shallow wells typically run dry seasonally.[13] Aquifers in the area have not been modeled, but anecdotal evidence suggests underground water is limited despite heavy annual rainfall because of low recharge in the area's granite bedrock and high surface runoff.

Small variations in terrain, soil, and water conditions in the study area give rise to micro-typographies that strongly influence cropping systems and cultivation practices on plots at different levels of the terraced landscape. Soils are generally low in organic matter and slightly acidic in some areas, making them relatively infertile. Farmers in the area identify three main land types: (1) upper terraces, or uplands, with light-textured soils; (2) middle terraces; and (3) lower terraces, or lowlands, which have heavier soils. The land type determines the amount and duration of moisture availability for agriculture. On upper and middle terrace plots, lack of moisture constrains cultivation outside the monsoon season, except in years of very high rainfall. On lowland plots heavy rainfall leads to submergence during the main growing season, which negatively affects crop yields, while retained moisture in the soil enables cultivation outside the monsoon season. In low rainfall years ambient soil moisture on lowland plots provides good yields. Despite intensive agricultural practices using manure for fertilizer, decades of intensive cultivation and deforestation have led to severe erosion and soil degradation in this delicate landscape.

Farms in villages surveyed for the ISI study apply diverse cropping and complex land-use systems in efforts to maximize farm output in the face of credit constraints and drought and flooding risk. Survey results suggest that farmers' first priority is to assure sufficient product for their household use, and only then to engage in commercial activity. The way farms use different crops and rice varieties, and apply different production techniques across plots of different land types appears to play a vital role in protecting farms against risks posed by the unfavorable environment. Adoption of high-yielding modern rice varieties is quite low at 15 percent. However, in contrast to popular perceptions that small-scale farmers are inefficient, in the relative small share of lowland rice plots where modern varieties are cultivated, analysis shows that study area rice farms were technically efficient.[14] Surveyed farms were also found to be technically efficient in cultivating traditional rice varieties on upper and middle terrace plots. These and other findings regarding farm technical efficiency and land

use highlight the complexity of local conditions and suggest the importance of basing policy interventions on detailed local knowledge.

Economic and Social Conditions

Decades of intensive cultivation and deforestation have led to severe erosion and soil degradation in this delicate landscape

Low standards of living and high poverty incidence predominate in the study area. Official estimates place the region's poverty incidence among the highest in India. According to the ISI study, the estimated average annual gross income per capita among surveyed households was only 4,018 rupees (Rs)—about US$100 at the 1997–98 exchange rate—well below the US$1 per day international poverty line (see Table 1). Using the India Planning Commission's official poverty line for 1999, this places 60 percent of sample households below the poverty line.[15] Average per capita gross income varied markedly across study area villages—ranging between Rs 3,000 and 6,500.

Households displayed low levels of savings, reflecting both their poverty and economic vulnerability. The principal form of savings is livestock holding, but cows and bullocks are also owned for draft power and dairy use. The mean value of livestock holdings was about Rs 8,000 per household. Nearly two-thirds of surveyed farms reported owning one or more bullocks. Rates of ownership of other smaller livestock and poultry were lower, but still common. Physical asset holdings, including agricultural implements and machinery, household appliances, and transport equipment, were limited to an average value of only about Rs 3,000 (equivalent to about US$76) per household. About 25 percent of sampled households reported owning no household appliances, ownership of radios and televisions was uncommon, and vehicle ownership was limited, with more than 75 percent of families indicating bicycles as their main form of transport. About one-third owned animal-driven transport and 4 percent owned a motorcycle. None owned automobiles.

Surveyed households with SC and ST backgrounds generally displayed lower income and capital holdings and were more likely to be poor than other households. Villages in which ST families predominated

Table 1. Income Sources and Poverty Among Surveyed Households

Income Source	Overall	Giridih	Purulia
Income from nonagricultural work	11,952	11,155	12,723
Share of gross income	39%	39%	39%
Income from off-farm agricultural work	1,042	485	1,582
Share of gross income	6%	4%	8%
Income from miscellaneous sources	1,018	1,140	900
Share of gross income	3%	3%	2%
Total value of crop output (both sold and home consumed)	9,144	11,306	7,053
Share of gross income	38%	42%	33%
Average value of crop output sold	753	712	793
Share of gross income	2%	1%	3%
Total value of livestock (both sold and home consumed)	4,112	3,765	4,449
Share of gross income	15%	12%	18%
Sale of livestock and livestock (main and by-products)	548	159	923
Share of gross income	3%	1%	4%
Total cash income	15,651	13,050	18,167
Share of cash income from rice production	35%	37%	33%
Gross income	27,269	27,850	26,707
Per capita gross income	4,018	4,026	4,010
Poverty incidence	60%	57%	63%

Source: ISI-IRRI Farm Household Survey.

tended to be most distant from water sources, roads, and other public facilities, although, admittedly, the study's sample of villages was small. In villages with households from diverse caste/ethnic backgrounds, residential segregation was observed and SC and ST families tended to hold less favorable land, suggesting inequality in the distribution of land across castes and tribal ethnic groups persists through land quality differences. The study area's risky agricultural environment and difficult market access make food security the primary goal in farming, and household resources —family labor and land—are principally applied to rainy season rice production for home consumption. In the off-season, household labor is left idle, or workers from farms secure temporary jobs in agriculture in neighboring areas, migrate to seasonal jobs in agriculture or construction, or engage in a variety of home-based handicraft industries, such as jute weaving and making pottery and leaf plates. In terms of farming activity, 90 percent of households engaged in rice production, but only 21 percent reported selling rice. Similarly, 22 percent produced potatoes, but only 2 percent reported selling them, and 21 percent produced but none reported selling maize. Animal husbandry activities were also predominantly subsistence oriented. Farmers appear reluctant to purchase seed, fertilizer, and other agrochemicals or make agricultural investments because of the high risk of crop failure and severe credit constraints.

Achieving significant improvements in the economic well-being of small farm households through agricultural intensification alone will be difficult

In light of these circumstances, subsistence orientation can be understood as a logical response to resource scarcity and high costs of engaging in market activities. Self-sufficiency and nonparticipation in formal markets insulate farm households from environmental and market shocks, but make them less responsive to market opportunities and appear to be inefficient and economically unmotivated.

Achieving significant improvements in the economic well-being of small farm households through agricultural intensification alone will be difficult, even with significant investment. Advances in productivity of traditional crops are unlikely to produce substantial changes in household income due to the small average size of landholdings and the small revenue margins of traditional crops.

Implications for Poverty Reduction in Rural Eastern India

The ISI study suggests that poverty among small farm households in remote rural areas in Eastern India results from environmental conditions, such as soil erosion and water scarcity; resource constraints, including small farm size and lack of infrastructure; and institutional problems, such as caste- and tribal-based divisions, corruption, and missing markets. Although farm households display creativity and efficiency in using scarce resources to generate income, the conditions and magnitude of need mean that efforts to develop unfavorable agricultural areas of Eastern India will require substantial support from the public sector. Fortunately, the reinvigorated Indian economy offers promise in terms of enabling development efforts to succeed because it both provides fiscal resources for development programs and spurs demand for small farm household products and labor.

Given the challenges faced and the depth of poverty in rural areas of Eastern India, alleviating poverty among farming households will require concurrent, proactive measures via three broad pathways:

(1) increasing agricultural productivity and shifting cultivation from subsistence to higher value crops;
(2) promoting nonagricultural development; and
(3) fostering labor market integration across urban areas and remote rural areas.

The first two approaches have been the mainstays of past development efforts, but generally have had little success. Nonetheless, given broader growth trends and the reforms achieved in the Indian economy over the past two decades, and with significant changes in the design and implementation of programs, there is cause for optimism regarding the potential success of policies directed along these three avenues.

Enhancing agricultural potential. Research and development of new drought-resistant rice varieties tailored to middle and upper terraces and extending credit to small farms in rainfed areas so modern rice

varieties or higher value crops could be more widely cultivated hold great promise for improving household food and income security. However, raising rice productivity *alone* is unlikely to lift the majority of the Eastern India small-scale rice farmers out of poverty. Adoption of higher value crops would likely require development of water management infrastructure, but experience with large public infrastructure projects argues against large-scale water infrastructure development and suggests that construction of wells, reservoirs, and other small-scale water harvesting technologies would offer better options. In light of improved market incentives and the more robust economic environment in India, often-tried efforts to extend agricultural technical assistance merit renewed attention. There is evidence that agricultural market liberalization has already led farmers in some areas to alter their agricultural practices and land-use patterns, and some rainfed lands have already been converted from cereal and other staple crops to cultivation of higher value industrial crops, such as sugarcane and cotton, or export crops like nuts and medicinal herbs.

Nonagricultural development alternatives. The small-farm households in the study area would benefit from small business micro-credit schemes, technical assistance on business operation, support of small-producer cooperatives, and provision of market information. Another development option for this pathway would be construction of road and electricity infrastructure in remote areas that have a comparative advantage in selected labor-intensive manufacturing activities. Some agricultural industries, for example, are advantaged by their closer proximity to key intermediate natural resources used in industry.

The menu-of-options approach would build upon the progress toward local control in rural poverty reduction policy

Supporting labor market integration. Policies should be crafted recognizing the relatively thin markets and highly seasonal demand for labor and should include measures to overcome these labor market inadequacies. Broadening the geographic and sectoral scope of labor market opportunities of workers from small farm households is vital to overcoming existing limitations and increasing the demand for unskilled labor. Possible policy instruments for enabling poor rural village dwellers to take advantage of employment opportunities include: development of infrastructure, such as roads and telecommunication; improving information networks and reducing labor market transaction costs; and employment/migration assistance, which would include short-term wage subsidies to employers hiring workers from poor localities, job training, and migrant worker information and assistance centers. Unlike the agricultural and nonagricultural development policy options, embracing labor market integration as a route to assist poor village residents would represent a departure from past efforts—many of which have had the goal of stemming rural-urban migration.

In terms of restructuring public programs to assist small landholding farm households, it is clear that decision making about program priorities and implementation should be deferred to the local level, but that interventions should be developed using technical expertise at the national level. The proposed menu-of-options approach would also extend the NREGS by enabling development financing for a wider range of programs besides the labor-intensive public works currently being implemented under that program. Such an approach would build upon the progress toward deference to local control in rural poverty reduction policy enshrined in the National Rural Employment Guarantee Scheme. Under this approach, targeted poor localities could be offered grants to finance development projects selected from a menu of program options. For example, according to their priorities localities could choose between making investments to improve road or irrigation infrastructure, creating a social fund or group lending arrangement, opening a job information office and financing locally based employment agents, or receiving technical assistance and free or subsidized seed and other materials needed to adopt new crops. Within broad project types, options could allow for a range of different approaches and technologies. Communities that prioritize irrigation extension, for example, could choose between development of low-cost, small-scale water harvesting technologies or larger traditional irrigation systems. Development

options generated centrally could then be prioritized and adapted to suit local circumstances.

Aside from financing and designing programming options, central government resources would need to be applied to implementation monitoring and program evaluation. Cost-benefit analysis would be required to advise localities about technical feasibility of certain options in their area, but ultimate decision making about priorities would be left to local government officials. Careful monitoring of expenditures and project outputs would be vital in light of the tendency for community development monies to be siphoned off by local elites. However, if grants are pocketed by corrupt local officials, disbursement at the *panchayat* level increases the likelihood that some of the funds will reach targeted communities nevertheless.

Failure to deliver the benefits of growth to remote rural areas would surely fuel opposition to reform

A main motivation underlying the advocated three-pathway approach is to reverse the biases that have weighed down many of India's past development policies. Too often, they have suffered from hidden prejudices that look down on agriculture and particularly small farms, considering them to be irrational and inefficient rather than responding rationally to the severe constraints they face and their economic incentives. Similarly, traditional arrangements and institutions, such as share tenancy or agricultural market intermediaries, tend to be viewed as exploitative and inefficient, and as barriers to progress, rather than second-best responses to constraints and market failures. A large body of both theoretical and empirical research exists supporting the view of "peasant" farms as rational but constrained. It explains apparently inefficient contractual arrangements as efficient responses to local constraints and market failures.[16]

Success in rural poverty mitigation efforts promises to reinforce popular support for economic reforms and further distance India's economic policy from its planning era problems. In contrast, failure to deliver the benefits of growth to remote rural areas would surely fuel opposition to reform and undermine the stability so vital to continued growth and development. These considerations make rural poverty mitigation in Eastern India a top priority in terms of fostering social equity and sustaining a political environment conducive for future growth.

Notes

[1]A discussion of the issues is provided in A. Deaton and V. Kozel, *Data and Dogma: The Great Indian Poverty Debate* (2005). Research paper available at www.wws.princeton.edu/rpds/downloads/deaton_kozel_datadogma.pdf (accessed August 2, 2006).

[2]The term "Tribal Belt" refers to an area spanning central India where individuals with Scheduled Tribe (ST) backgrounds represent large shares of the total population. See note 8 for definition of ST.

[3]India Ministry of Finance, Economic Survey 2003–04. Available online at http://indiabudget.nic.in/es2003-04/esmain.htm (accessed February 13, 2006).

[4]The terms "Scheduled Caste" (SC) and "Scheduled Tribe" (ST) were adapted by British colonial administrators to describe two communities at the bottom of India's social hierarchy. Individuals of SC backgrounds historically occupied the lowest strata of traditional Hindu society. They include so-called "untouchables" or *Dalits* (disadvantaged or outcasts) and represent approximately 15 percent of India's populace. Historically, individuals of ST background came from communities outside mainstream Hindu society that rejected the caste system. The term ST carries connotations of indigenous ethnic minority peoples and of communities that resided in remote forest, jungle, or mountain areas far from densely populated lowlands. These individuals represent about 7.5 percent of India's population. Discrimination against persons based on caste has been illegal since independence from Britain, and there are long-standing policies to reserve jobs, university admissions, and seats in representative bodies to SC/ST individuals in an effort to remedy past discrimination and foster the full participation of these communities in India's economy and government.

[5]See P. Banik, C. Edmonds, N. Fuwa, S.P. Kam, L. Villano, and D.K. Bagchi, "Natural Resource Endowments, Subsidence Agriculture, and Poverty in the Chhotanagpur Plateau," *IRRI Discussion Paper* No. 47 (Los Banos, Philippines: International Rice Research Institute, 2004).

[6]J. Pender and R. Ruben, "Rural Diversity and Heterogeneity in Less-favoured Areas: The Quest for Policy Targeting," *Food Policy* 29 (2004): 303–320.

[7]This point is also made in S. Srivastava, C. Dutt, R. Nagaraja, S. Bandyopadhayay, H. Meena Rani, V. Hedge, and V. Jayaraman, "Strategies for Rural Poverty Alleviation in India: A Perspective Based on Remote Sensing and GIS-based Nationwide Wasteland Mapping," *Current Science* 87, no. 7: 954–959.

[8]This debate is most recently highlighted in William Easterly, *White Man's Burden* (New York: The Penguin Press, 2006).

[9]Often-quoted commentary by P. Bardhan characterizes Indian land reform as one in which legislation abounded but the real impact upon the rural poor was greatly muted by unenthusiastic implementation. See P. Bardhan, "India" in Chenery et al., eds., *Redistribution and Growth* (Oxford: Oxford University Press, 1970). This characterization is supported by studies of the impact of Indian states' land reform initiatives. See T. Besley and R. Burgess, "Land Reform, Poverty Reduction, and Growth: Evidence from India," *Quarterly Journal of Economics* 115, no. 2: 389–430.

[10]Detailed in R.B. Singh, P. Kumar, and T. Woodhead, "Smallholder Farmers in India: Food Security and Agricultural Policy," *Publication 2002/03* (Bangkok, Thailand: Regional Office for Asia and the Pacific, Food and Agriculture Organization, 2002).

[11]See C. David and K. Otsuka, eds., *Modern Rice Technology and Income Distribution in Asia* (Boulder, Colorado: Lynne Rienner Publishers, 1994).

[12]See A.O. Krueger, M. Schiff, and A. Valdes, "Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies," *World Bank Economic Review 2*, no. 3 (September): 255–271.

[13]Water table depth varies from 3m to more than 12m during the summer. See Bhattacharya et al., "West Bengal District Gazetteers Purulia," (Government of West Bengal, Calcutta: Narendra Nath Sen Publishing, 1985) 24–25; and A.K. Maiti and D.K. Bagchi, "Perception, Performance and Potential Development in Usri Watershed Area of Bihar Plateau Region: An Ecosystemic Approach," (1993). Project reports submitted to ICSSR, India, for additional characterization.

[14]See N. Fuwa, C. Edmonds, and P. Bank, "How Inefficient Are Small-Scale Rice Farmers in Eastern India Really?: Examining the Effects of Microtopography on Technical Efficiency Estimates," *East-West Center Working Papers, Economics Series* no. 79 (Honolulu: East-West Center, 2005). Available at www.EastWestCenter.org/stored/pdfs/ECONwp079.pdf.

[15]The poverty line comes from A. Deaton, "Computing Prices and Poverty Rates in India 1999–2000," Working Paper Research Program in Development Studies (Princeton, NJ: Princeton University, 2001). Our estimated poverty incidence is based on gross household income per capita and the figure would likely be higher were data on net income available.

[16]This literature is often referred to as the New Institutional Economics. For examples of the application of this approach and a survey of the new institutional economic literature, see P. Bardhan and C. Udry, *Development Microeconomics* (Oxford: Oxford University Press, 1999).

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The Asia Pacific Issues series reports on topics of regional concern.

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